TECHNOLOGY OFFER

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Chromatography bed operating without wall effect

Current 3D printed chromatography material is not suited for separation of biomolecules. The mesh size or channel sizes are too big to facilitate industrial/ practically relevant performance. Using high performance printing technologies, monoliths have been developed, which exhibit high capacity, regular structure and no wall effects in order to be used for bioseparation purposes.

BACKGROUND

Packed bed chromatography is currently the most used technology for biomolecule separation as well as for separation tasks in other industry. The widespread application of this technology led to a huge endeavor for optimization and current chromatography packed bed medias are very suitable for biomolecules, but still fall short for bionanoparticles as such as viruses, virus like particles or exosomes, which is especially a problem for novel gene therapy products or vaccines for emerging viral diseases. The main limitation of packed bed chromatography is the unavoidable packing method itself, generating a random bed structure. Inhomogeneities in the column due to the packing, and especially between the packed material and the column housing (so called wall effects) significantly reduce the chromatographic performance of the column.

TECHNOLOGY

A material with strictly regular channels is proposed for separation of biomolecules such as large proteins and other biopolymers including bionanoparticles such as viruses, virus like particles or exosomes. Using high performance printing technologies the channel width is in the range of 1 to 10 µm, suitable for chromatographic purpose. A substantial surface is provided to enable high binding capacity or in case of analytical separation a high peak capacity while abolishing wall effect typical for packed bed, a monolith or membrane chromatography. The generated material has a completely homogenous and regular structure and the structure close to the wall and in the rest of the bed is identical. The channel surface can be functionalized with all functional groups used in bioseparation. Additionally, these regular beds can be stacked in order to perform different chromatography modes in a single column.

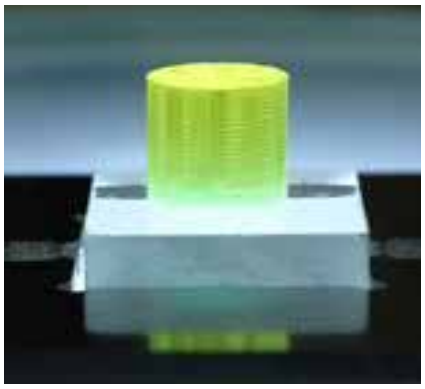

Figure: Printed porous structure on the printing support

BENEFITS

- The use for bioseparation of bionanoparticles such as viruses and virus like particles
- The 3D printing of structures with pore sizes below 200 µm suitable for chromatographic separation
- The generation of strictly regular chromatographic structures by 3D printing
- The use of two photon polymerization for the generation of acrylate based chromatographic structures

REFERENCE:
202007

AVAILABLE FOR:
- License Agreement
- Cooperation
- Patent Purchase

APPLICATION:
Efficient separation of large molecules and bionanoparticles

KEYWORDS:
Chromatography, monolith 3D Printing, virus, virus like particles

DEVELOPMENT STATUS:
Proof of concept; TLR 3

IPR:
EP prio

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